Выполнены эксперименты по алюминотермическому восстановлению диоксидов титана и циркония в лабораторных печах различного типа [3], что с определенным приближением позволяет моделировать промышленные электропечные плавки (таблица – 1).

Таблица 1. Химический анализ продуктов

№	Расплав	% Zr	% Al	% Ca	% Mo	% Ti	% N	% O
1	Me	58.59	41.62				0.007	0.17
	Шл	4.14	35.42	19.65				
2	Me	44.36	48.06	0.66	3.9	4.12	0.009	0.09
	Шл	1.97	34.66	22.82	0.015	0.08		
3	Me	56.9	42.8	0.6			0.12	0.98
	Шл	4.64	34	18.7				

1. Агафонов С.Н., Красиков С.А. и др., Неорганические материалы., Т. 48, № 8, 927, (2012).
2. Агафонов С.Н., Красиков С.А., Расплавы, №6, 37-42, (2012).
3. Агафонов С.Н., Красиков С.А. и др., Цветные металлы, № 12, 66–70, (2013).

STUDY OF THE CHANGE of PHASE COMPOSITION OF CO_X/NI_Y NANOTUBES DEPENDing On THE POTENTIAL DIFFERENCE

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Important aspects of the development of the nanotechnology are methods and mechanisms of synthesis of nanostructures. One of the most efficient methods is template synthesis in which the porous material is used as a template (in our case track membrane). This method allows the synthesis of nanoscale objects of various shapes and sizes which can be controlled precisely [1-5].

Track membranes fabricated from polyethylene terephthalate (PET) type Hostaphan® manufactured by «Mitsubishi Polyester Film» (Germany) were used as a template matrices. The films were irradiated on heavy ion accelerator DC-60 by accelerated krypton ions with energy of 1.75 MeV/nucleon and flux 1.00E+09 ion/cm^2. Electrolyte solution: $CoSO_4 \times 7H_2O$ (120 g/L), $NiSO_4 \times 6H_2O$ (100,14 g/L), H_3BO_3 (45 g/L), $C_6H_8O_6$ (1,5 g/L).

SEM analysis of the images showed that the obtained nanostructures have a height that is equal to the thickness of the template, which is 12 mm and the diameter of 115±5 nm. The existence of copper/gold in the spectrum is due to the fact that conductive layer was sprayed on the polymer matrix before the galvanic deposition. Taking atomic ratio of Co/Ni into account composition of synthesized arrays of nanostructures can be represented as following: sample 1 - $Co_{94}Ni_6$, sample 2 - $Co_{88}Ni_{12}$, sample 3 - $Co_{80}Ni_{20}$. According to the results of the study we can draw the following conclusion: when the potential difference across the electrodes decreases atomic ratio of cobalt to nickel decreases.

1. Hulteen J.C., Martin C.R. J. Mater. Chem., 7, 1075, (1997).
2. Chakarvarti S.K., Vetter J. Radiation Measurmaents, 29, 149-159, (1998).
3. Foss C.A., Hornyak G.L., Stockert J.A., Martin C.R. Journal of Physical Chemistry, 98, 2963, (1994).
4. Martin C.R. Advanced Materials, 3, 457, (1991).
5. Yuan G., Wei Y., Meng K. et al. Chinese Chemical Letters, 13 (11), 1115–1118, (2002).

СИНТЕЗ И ИССЛЕДОВАНИЯ МАГНИТНЫХ СВОЙСТВ ЛИТИЕВЫХ МЕТАЛЛОФОСФАТОВ $LiMPO_4$ И $LiMM'PO_4$ (M, M' - Mn, Mg, Co, Ni)

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SYNTHESIS AND MAGNETIC PROPERTIES OF LITHIUM METALLOPHOSPHATES $LiMPO_4$ AND $LiMM'PO_4$ (M, M' - Mn, Mg, Co, Ni)

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The purpose of this work was investigation of the magnetic properties of lithium metallophosphates $LiMPO_4$ and $LiMM'PO_4$ (M, M' = Mn, Mg, Co, Ni) with an ordered olivine structure. These systems have excellent magnetic and optical properties and therefore can be used as promising materials for different applications.